

# Brief Resolved Unexplained Event

## PEARLS

Definition of Brief Resolved Unexplained Event (BRUE):

These are sudden, brief (less than 1 minute), now resolved (returned to baseline) episodes of at least one of the following in a child less than 1 years old:

1. Cyanosis or pallor
2. Absent, decreased, or irregular breathing
3. Marked change in tone (hyper- or hypotonia)
4. Altered level of responsiveness

**NOTE:** Most children who experience a BRUE have a normal physical exam, however, almost 50% will have an underlying condition requiring comprehensive medical care.

In many cases, details from the child's home may be important to downstream health care clinicians. Please include details, such as the following, when providing report to the hospital:

1. Make note of the home environment: Medications, condition, caregiver's condition, possibility of toxic exposure, etc.
2. Are there any concerns for non-accidental trauma?

## EMT/ADVANCED EMT /PARAMEDIC:

1. Obtain medical history
    - a. Determine the severity, nature, and duration of the episode
    - b. Was the patient awake or sleeping at the time of the episode?
    - c. Include details of the resuscitation, if applicable
  2. Keep the child warm and transport to the emergency department
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3. Contact OLMC for assistance if the parent/guardian refuses medical care and/or transport
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# Pediatric Respiratory Distress with Inspiratory Stridor

Inspiratory stridor may be due to many causes in the pediatric population, including croup, foreign body aspiration, or epiglottitis.

Stridor refers to upper airway obstruction as in laryngotracheitis/croup and is often accompanied by hoarseness and/or a barking cough (seal-like cough).

As stridor worsens in severity, the following may also be observed: tachypnea, retractions, accessory muscle use, nasal flaring, fatigue from respiratory effort, and cyanosis.

## EMT / ADVANCED EMT

1. Humidified O<sub>2</sub>, if available and as appropriate, with upright posture
2. If needed, assist ventilations with PPV using 100% O<sub>2</sub>
3. Request ALS, if available

## PARAMEDIC

4. Dexamethasone 0.6 mg/kg **PO/IV/IM/IO** x 1 (MAX dose 10 mg)
5. For signs of moderate to severe croup, administer inhalation of **nebulized** solution of 1 mL 1mg/mL EPINEPHrine OR 0.5 mL racemic epinephrine mixed with 2 mL normal saline solution\*. Signs of moderate/severe croup include stridor at rest AND one of the following: tachypnea, moderate intercostal retractions (including suprasternal retractions), agitation/restlessness/tired appearing, difficulty talking or feeding.

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6. Contact OLMC for the second dose of nebulized EPINEPHrine if symptoms do not improve or consider alternate diagnosis such as aspiration of foreign body, bacterial tracheitis, epiglottitis.
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\* Nebulized EPINEPHrine/racemic EPINEPHrine may be contraindicated in children with a history of congenital heart disease.

## PEARLS

A common challenge when working with the pediatric population is the administration of medication. If commercial products are unavailable, alternative measures are often undertaken, such as crushing and dissolving portions of a tablet, or extemporaneous compounding of oral products. In some cases, an extemporaneous liquid cannot be prepared easily from tablets or capsules and off-label oral use of an intravenous (IV) or intramuscular (IM) preparation is considered. An example of this is administering the *injectable* formulation of dexamethasone *orally*. This practice is followed in emergency departments around the country.

**Please note that at this time, the only IV medication on the MEMS formulary that has been approved to be given orally is single-dose/one-time use dexamethasone.**

# Neonatal and Young Infant Fever

## PEARLS

Neonates and young infants have immature immune systems and are at high risk for serious bacterial infection despite appearing well. The rate of serious bacterial infection (SBI) is up to 20% in neonates. Often, fever may be the only sign of critical illness in these children. All febrile neonates and young infants should be transported to the emergency department for further evaluation.

### Definitions:

- Neonates are children 0-28 days old
- Young infants are less than 90 days old.
- Fever is a temperature of greater than or equal to 38.0 °C or 100.4 °F measured by any method by either caregivers or EMS.
- Serious Bacterial Infections (SBI) in neonates and young infants may also present with hypothermia (temperature less than 35.0°C or 95.0 °F)

### EMT/ADVANCED EMT/PARAMEDIC:

1. Obtain medical history
    - a. What was the highest temperature? How was it recorded?
    - b. Is the child still feeding normally? If not, are there signs of dehydration?
    - c. Birth history: was the baby full-term or premature? Was the baby admitted to the NICU?
    - d. Were there complications from the pregnancy/delivery?
  2. Evaluate the neonate or young infant for the following:
    - a. Appearance (tone, inter-activeness, consolability, gaze, cry)
    - b. Work of breathing (abnormal noises or position, retractions, flaring)
    - c. Circulation (pallor, mottling, cyanosis)
    - d. Evidence of dehydration
  3. Evaluate for shock due to severe sepsis. If present, treat per Medical Shock protocol, **Gold 14** and notify receiving hospital.
  4. Transport to the emergency department for further evaluation.
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5. Contact OLMC for assistance if the caregiver/guardian refuses medical care and/or transport
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# Childbirth, #1

## EMT/ADVANCED EMT/PARAMEDIC

1. Evaluate for crowning/imminent delivery
2. If crowning/imminent delivery, encourage mother to relax, breathe slowly, and let baby deliver
2. If hypotensive, roll patient onto left or right hip
3. If the presenting part is the cord, apply pressure to the baby with a sterile, gloved hand to keep pressure off the cord until cord pulsations are felt. Raise mother's hips onto pillows. Keep cord warm and moist. Do not clamp or cut cord
4. Request ALS, if available, and DO NOT DELAY TRANSPORT
5. If baby's head is delivering:
  - a. Do not hurry or slow the birth
  - b. Check to see if cord is wrapped around neck. If so, attempt to slip the cord over the baby's head, then repeat in case of double nuchal cord. Do not clamp and cut the cord unless it appears to obstruct the birth
  - c. Immediately place baby skin-to-skin with the mother, unless resuscitation is required. Dry and stimulate the baby, examine and keep warm, next to mother's skin, covering mother and baby with warm blankets or aluminum foil blankets (i.e. "space blankets"). As soon as possible, enable child to nurse at mother's breast. In a stable newborn, remain on scene, as conditions permit for a minimum of 15 minutes to allow for skin-to-skin contact.
  - d. Assess APGAR SCORE at 1 and 5 minutes, refer to APGAR Score, **Pink 6**
  - e. Do not externally massage the uterus en route until placenta has delivered
  - f. Do not forcibly remove placenta
  - g. The cord may be left intact, or it may be double clamped and cut only when:
    1. the baby is breathing and all cord pulsations have stopped (usually within 3 to 5 minutes), or
    2. the baby must be moved to allow for advanced newborn resuscitation, or
    3. Once the placenta has delivered.
  - h. If placenta is delivered, wrap and package with cord intact
6. If delivery has occurred prior to EMS arrival, start at #5b above.
7. During transport, the baby should be placed in an appropriate child passenger restraint system with the head supported. Maintain warmth during transport. Wrap the baby in warm blankets or aluminum foil blankets (i.e. "space blankets") and a warming hat to minimize heat loss. Consider using a Maine EMS approved infant warming pad during transport.
8. ***Monitor the baby's airway during transport. Hypothermia in the newborn may cause decreased LOC, hypoglycemia, bradycardia and hypotension.***

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Continued



## Childbirth, #2

### Continued from previous page

9. Most deliveries proceed without complications – If complications of delivery occur, the following steps are recommended:

a. **Shoulder dystocia** – if delivery fails to progress after head delivers, quickly attempt the following:

- i. Hyperflex mother's hips to severe supine knee-chest position
- ii. Apply firm suprapubic pressure to attempt to dislodge shoulder
- iii. Apply high-flow oxygen to mother
- iv. Transport as soon as possible
- v. Contact closest appropriate receiving facility



b. **Prolapsed umbilical cord**

- i. Placed gloved hand into vagina and gently lift head/body off of cord
  1. Assess for pulsations in cord
  2. Maintain until relieved by hospital staff.
- ii. Consider placing mother in prone knee-chest position or extreme Trendelenburg
- iii. Apply high-flow oxygen to mother
- iv. Transport as soon as possible
- v. Contact closest appropriate receiving facility



c. **Breech birth**

- i. Place mother supine, allow the buttocks and trunk to deliver spontaneously, then support the body while the head is delivered
- ii. If head fails to deliver, place gloved hand into vagina with fingers between infant's face and uterine wall to create an open airway
- iii. Apply high-flow oxygen to mother
- iv. The presentation of an arm or leg through the vagina is an indication for immediate transport to hospital
- v. Assess for presence of prolapsed cord and treat as above
- vi. Transport as soon as possible
- vii. Contact closest appropriate receiving facility



d. **Excessive bleeding** during active labor may occur with placenta previa

- i. Obtain history from patient
- ii. Placenta previa may prevent delivery of infant vaginally
- iii. C-Section needed – transport urgently
- iv. Contact closest appropriate receiving facility



e. **Maternal cardiac arrest**

- i. Apply manual pressure to displace uterus from right to left
- ii. Treat per **Red 8**, Cardiac Arrest - defibrillation and medications should be given for same indications and doses as if non-pregnant patient
- iii. Contact OLMC to discuss rapid transport if infant is estimated to be over 24 weeks gestation
  1. Perimortem Cesarean section at receiving facility is most successful if done within 5 minutes of maternal cardiac arrest



**10. If any of the above conditions are present, the patient is best cared for at a hospital with Obstetric (OB) services. If the patient condition permits, transport to the nearest hospital with OB capabilities if total transport time is less than 45 minutes, otherwise go to the closest ED. For questions, contact OLMC.**

# APGAR Score

Assess the baby at 1 minute and again at 5 minutes

DO NOT DELAY RESUSCITATION to obtain APGAR Score

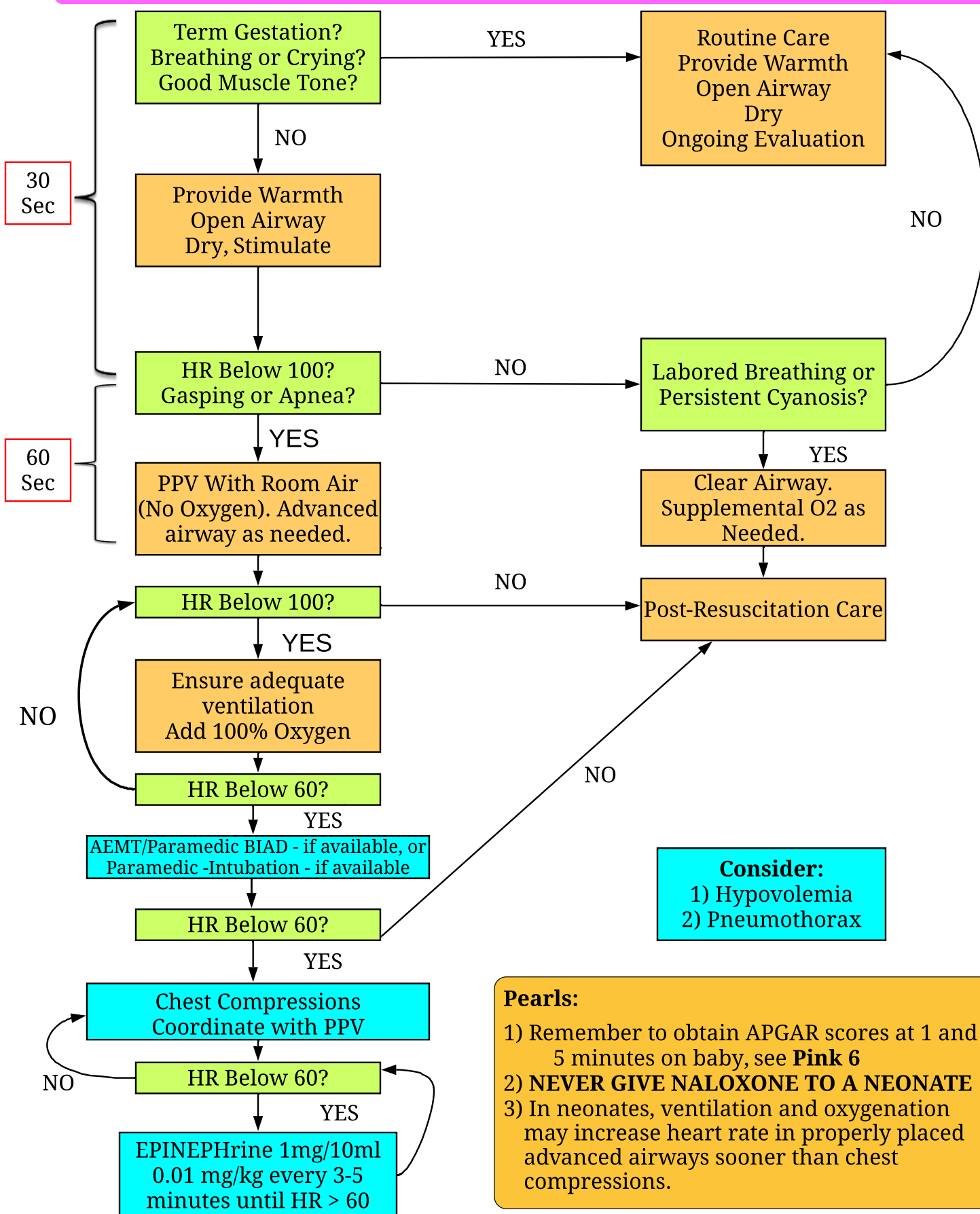
A score of less than 7 suggests need for resuscitation with suction, ventilation, and ALS back up

APGAR Score				
		0	1	2
A	Appearance	Blue or Pale	Body Pink/ Hands Blue	Pink
P	Pulse	Absent	less than 100	greater than 100
G	Grimace*	None	Grimace	Cough
A	Activity**	Flaccid	Some	Good
R	Respiration	Absent	Weak	Good

\* Tested by a suction catheter or bulb syringe tip gently placed in the nose or mouth

\*\* Amount of spontaneous flexion of extremities

# Neonatal Resuscitation



## Normal Pediatric Vital Signs, # 1

Normal Pediatric Vital Signs					
Age	Approximate Weight (kg)	Pulse/Min	Resp/Min	Minimum Systolic BP	Glucose (mg/dl)
Newborn	3	100-160	30-60	60	45-120
6 months	7	100-160	30-60	70	100-180
1 year	10	100-140	24-40	70	
2 years	12	80-130	24-40	70	
3	15	80-130	24-40	Multiply age x 2 and add 70	
4	16	80-120	22-34		
5	18	80-120	22-34		
6-7	20	70-110	18-30		
8-9	25	70-110	18-30		
10-11	35	60-100	16-24		
12-13	40	60-100	16-24		70-120
14	50	60-100	16-24		
15	55+	60-100	14-20		

Note: Estimated weight in kilograms:  $[2 \times (\text{age in years})] + 8$

\* Typical Systolic BP in children 1-10 years of age:  $90 + (\text{age in years} \times 2)$

\* Lower Limits of Systolic BP for a child age 3-15 years:  $70 + (\text{age in years} \times 2)$

## Normal Pediatric Vital Signs, # 2

Modified GCS for Infants and Children			
	Child	Infant	Score
EYE OPENING	Spontaneous	Spontaneous	4
	To speech	To speech	3
	To pain only	To pain only	2
	No response	No response	1
BEST VERBAL RESPONSE	Oriented/Appropriate	Coos and babbles	5
	Confused	Irritable, cries	4
	Inappropriate words	Cries to pain	3
	Incomprehensible sounds	Moans to pain	2
	No response	No response	1
BEST MOTOR RESPONSE	Obeys commands	Moves spontaneously/ purposefully	6
	Localizes painful stimuli	Withdraws to touch	5
	Withdraws in response to pain	Withdraws in response to pain	4
	Flexion in response to pain	Abnormal flexion in response to pain	3
	Extension in response to pain	Abnormal extension in response to pain	2
	No response	No response	1

## Pediatric Specific Equipment Sizes

Equipment	GREY 3-5 kg	PINK Small Infant 6-7 kg	RED Infant 8-9 kg	PURPLE Toddler 10-11 kg	YELLOW Small Child 12-14 kg	WHITE Child 15-18 kg	BLUE Child 19-23 kg	ORANGE Large Child 24-29 kg	GREEN Adult 30-36 kg
BVM	Infant or child	Infant or child	Infant or child	Child	Child	Child	Child	Child	Adult
Oral Airway (mm)	50	50	50	60	60	60	70	80	80
Laryngo- scope Blade (size)	1 straight	1 straight	1 straight	1 straight	2 straight	2 straight	2 straight or curved	2 straight or curved	3 straight or curved
ET Tube	3.0 cuffed	3.0 cuffed	3.0 cuffed	3.5 cuffed	4.0 cuffed	4.5 cuffed	5.0 cuffed	6.0 cuffed	6.5 cuffed
ET Tube Insertion length (cm)	3 kg 9-9.5 4 kg 9.5-10 5 kg 10-10.5	10.5-11	10.5-11	11-12	13.5	14-15	16.5	17-18	18.5-19.5
Stylet	Pedi	Pedi	Pedi	Pedi	Pedi	Pedi	Adult	Bougie	Bougie
Suction Catheter (F)	8	8	8	10	10	10	10	10	10-12
BP Cuff	Neonate	Infant or child	Infant or child	Child	Child	Child	Child	Child	Small adult
IO (Ga)	18/15	18/15	18/15	15	15	15	15	15	15
NG Tube (F)	5-8	5-8	5-8	8-10	10	10	12-14	14-18	16-18
LMA	1	1.5	1.5	2	2	2	2.5	2.5	3
KING	0	1	1	1	2	2	2	2.5	2.5

For ET size, pinky finger diameter in a child affords an acceptable approximate of ET tube outer diameter. The formula for tube size is as follows: "Age (in years)/4 + 3.5 (cuffed)" and the length-based tape may be used for internal diameter determination. Using a tube one size larger or smaller than this guideline is also acceptable.



# Pediatric Transportation, #1

## PEARLS

These guidelines apply to transporting pediatric patients who are of an age/weight that require a child safety seat. Pediatric patients that don't require a child safety seat should be transported following adult guidelines.

Maine Statute 29-A M.R.S. §2081(2) & (3) requires all children weighing less than 80 pounds, less than 57 inches in height and less than 8 years old to be properly restrained in a child safety seat when riding in a vehicle. Children between 40 and 80 pounds AND less than 8 years of age must be properly secured in a child restraint system in accordance with the child restraint system manufacturer's recommendations. An ill or injured child must be restrained in a manner that minimizes injury in an ambulance crash. The best location for transporting a pediatric patient is secured directly to the ambulance cot. Never allow anyone to hold an infant or child during transport.

### TYPES OF RESTRAINTS:

1. Convertible (traditional) car seat with two belt paths (front and back) with four points for belt attachment to the cot is considered best practice for pediatric patients who can tolerate a semi-upright position.
  - a. Position safety seat on cot facing foot-end with backrest elevated to meet back of child safety seat.
  - b. Secure safety seat with 2 pairs of belts at both forward and rear points of seat.
  - c. Place shoulder straps of the harness through slots just below child's shoulders and fasten snugly to child.
  - d. Follow manufacturer's guidelines regarding child's weight.



**Note:** Non-convertible safety seats cannot be secured safely to cot. If child's personal safety seat is not a convertible seat, it cannot be used on the cot.

2. Stretcher harness device with 5-point harness (examples: Ferno Pedi-Mate, SafeGuard Transport, ACR)
  - a. Attach securely to cot utilizing upper back strap behind cot and lower straps around cot's frame.
  - b. 5-point harness must rest snugly against child. Secure belt at child's shoulder level so no gaps exist above shoulders.
  - c. Adjust head portion of cot according to manufacturer's recommendation.
  - d. Follow manufacturer guidelines for weight ratings.

Examples	Weight Range
Ferno Pedi-Mate	10-40 pounds
Ferno Pedi-Mate Plus	10-100 pounds
Quantum ACR4	4-99 pounds



3. Car bed with both a front and rear belt path (example: Dream Ride Infant Car Bed)
  - a. For infants who cannot tolerate a semi-upright position or who must lie flat.
  - b. Position car bed so infant lies perpendicular to cot, keeping infant's head toward center of patient compartment.
  - c. Fully raise backrest and anchor car bed to cot with 2 belts, utilizing the 4 attachment sites supplied with car bed.
  - d. Only appropriate for infants from 5 – 20 lbs.



# Pediatric Transportation, #2

4. Isolette/Incubator must be secured to ambulance according to manufacturer's guidelines.
  - a. Secure infant using manufacturer's restraint. (Five-point harness restraint is preferred.)
  - b. Blankets or towels may be used for additional stabilization

## NON-PATIENT TRANSPORT

Best practice is to transport well children in a vehicle other than the ambulance, whenever possible, for safety.

If no other vehicle is available and circumstances dictate that the ambulance must transport a well child, he/she may be transported in the following locations:

1. Captain's chair in patient compartment using a size appropriate integrated seat or a convertible safety seat.
2. Passenger seat of the driver's compartment if child is large enough (according to manufacturer's guidelines) to ride forward-facing in a child safety seat or booster seat. Airbag should be turned off. If the air bag can be deactivated, an infant, restrained in a rear-facing infant seat, may be placed in the passenger seat of the driver's compartment.



## USE OF PATIENT'S CHILD SAFETY SEAT AFTER INVOLVEMENT IN MOTOR VEHICLE CRASH

The patient's safety seat may be used to transport child to the hospital after involvement in a minor crash if ALL of the following apply:

1. It is a convertible seat with both front and rear belt paths.
2. Visual inspection, including under movable seat padding, does not reveal cracks or deformation.
3. Vehicle in which safety seat was installed was capable of being driven from the scene of the crash.
4. Vehicle door nearest the child safety seat was undamaged.
5. The air bags (if any) did not deploy.

## MOTHER AND NEWBORN TRANSPORT

1. Secure and transport mother on the cot.
2. Consider transporting mother and newborn in separate ambulances to properly secure each patient to a cot.
3. Transport newborn secured to the rear-facing clinician seat /captain's chair using a size-appropriate child restraint system. Either a convertible safety seat with a forward-facing belt path or an integrated child restraint system certified by the manufacturer to meet FMVSS No. 213 may be used to secure infant.
4. Do NOT use a rear-facing only safety seat in the rear-facing clinician seat / captain's chair as this is dangerous and may lead to significant injuries.